

Chapter 1.

PREVALENCE AND TRENDS OF SMOKELESS TOBACCO USE IN THE UNITED STATES

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INTRODUCTION

This chapter defines the various forms of smokeless tobacco that are used in the United States and examines the data that pertain to trends in prevalence and patterns of use. Trends in smokeless tobacco production and sales and self-reported use are considered. Methodological considerations are discussed and research needs are identified.

Tobacco was used by pre-Columbian American Indians in smokeless forms as well as smoked (1). Cultivated by American colonists, tobacco became a major commodity in trade with Europe. Until the end of the 19th century, the use of smokeless tobacco products was widespread in the United States. Its use declined rapidly in this century with the advent of antisputting laws, loss of social acceptability, and increased popularity of cigarette smoking (1,2). Use was primarily confined to rural and agricultural areas and to occupational settings where smoking was not allowed, such as mining and some industries (3,4). In the Southeastern United States, especially in rural areas, oral use of dry snuff remained popular among women (5,6).

PRODUCT CHARACTERISTICS

Today, smokeless tobacco is produced in two general forms: chewing tobacco and snuff (7-10). Chewing tobacco is chewed or held in the cheek or lower lip. Three primary types of chewing tobacco are marketed: looseleaf, plug, and twist. Snuff has a much finer consistency than chewing tobacco and is held in place in the mouth without chewing. It is marketed in both dry and moist forms. Although smokeless tobacco is not subject to combustion and is usually used orally in the United States, products differ with regard to several factors, including type of tobacco plant used, parts of the tobacco plant used, method of curing, moisture content, and additives. For example, looseleaf chewing tobacco is made from air-cured, cigar-type leaves from tobacco that is grown in Pennsylvania and Wisconsin. In contrast, dry snuff is made primarily from fire-cured dark tobacco that is grown in Kentucky and Tennessee. Plug tobacco and snuff come in dry and moist forms. Many smokeless tobacco products are sweetened with sugar or molasses. Many are flavored; licorice is a common additive for chewing tobacco, while mint and wintergreen often are used to flavor snuff. Table 1 describes the types of smokeless tobacco and how they are used and packaged (7-10).

TRENDS IN PRODUCTION AND SALES

United States Department of Agriculture (USDA) records on the annual production and sales of smokeless tobacco serve as indicators of the population's consumption. Changes in consumption can be inferred from changes in production and sales. Because sales figures closely resemble those for production, only production will be reported.

TABLE 1.—Characteristics of Smokeless Tobacco Products

Product	Description	How Used	Packaging*
CHEWING TOBACCO			
Looseleaf	Made from air-cured, cigar leaf tobaccos of Pennsylvania and Wisconsin. Consists of stripped and processed tobacco leaves. The leaves are stemmed, cut, or granulated and are loosely packed to form small strips of shredded tobacco. Most brands are sweetened and flavored with licorice.	A piece of tobacco, 3/4 to 1 inch in diameter, is tucked between the gum and jaw, usually to the back of the mouth.	Pouch, typically 3 ounces. A few brands market a 1.5-ounce pouch.
Plug	Made from enriched tobacco leaves (Burley and bright tobacco and cigar tobacco) or fragments wrapped in fine tobacco and pressed into bricks. May be firm (less than 15 percent moisture) or moist (15 percent or greater moisture). Most plug tobacco is sweetened and flavored with licorice.	Chewed or held in the cheek or lower lip. May be held in the mouth for several hours.	A compressed brick or flat block wrapped inside natural tobacco leaves. Packaged in clear plastic. Packages range from 7 to 13 ounces. Also sold by the piece.
Twist	Handmade of dark, air-cured leaf tobacco treated with a tarlike tobacco leaf extract and twisted into strands that are dried. Majority is sold without flavoring and sweeteners.	Similar to plug.	A pliable but dry rope. Sold by the piece, packaged in plastic bags. No standard weight. Sold in small (approximately 1-2 ounces) and larger sizes based on the number of leaves in the twist.
SNUFF			
Moist	Made from air-cured and fire-cured tobacco. Consists of tobacco stems and leaves that are processed into fine particles or strips. Some products are flavored. Has a moisture content of up to 50 percent.	A small amount ("pinch") is placed between the lip or cheek and gum and is typically held for 30 minutes or longer per pinch.	Cans and plastic containers, typically 1.2 ounces.
Dry	Most dry snuff is made from fire-cured tobaccos of Kentucky and Tennessee. After initial curing, the tobacco is fermented further and processed into a dry powdered form. Products vary in strength and flavoring. Generally has a moisture content of less than 10 percent.	Same as moist snuff. May also be sniffed.	Metal cans or glass containers, vary from 1.15 to 7 ounces per container.

* Product weight (includes moisture).

Categories of Products

The USDA reports production and sales by product category (i.e., chewing tobacco and snuff). The definitions of categories changed in 1981. Prior to 1981, total figures for chewing tobacco were derived by summing data for the subcategories of plug, twist, looseleaf, and fine-cut; snuff was a separate category. However, fine-cut tobacco is used in moist snuff. To reflect this fact, after 1981 USDA shifted fine-cut from the category of chewing tobacco to moist snuff. To observe and clarify temporal trends for the purposes of this review, the data presented in figure 1 reflect a uniform category system across years. In these records, fine-cut tobacco is counted consistently as snuff (11-17).

Temporal Trends

Figure 1 depicts temporal trends in the quantities of smokeless tobacco that were manufactured in the United States from 1961 to 1985. Between 1944 and 1968, total smokeless tobacco production declined 38.4 percent from 150.2 to 92.5 million pounds. Subsequent increases in production reached 135.6 million pounds in 1985.

Between 1970 and 1985, total snuff production increased 56 percent from 31.3 to 48.7 million pounds. This increase was due to changes in the production of moist snuff; the manufacture of dry snuff declined (3). The difference in trends in the production of moist and dry snuff is shown in figure 1 for the years 1981 through 1985. Separate production data are not available for the two types of snuff prior to 1981. Between 1970 and 1981, however, the production of fine-cut tobacco, used in the manufacture of some moist snuff, increased threefold from 4.8 to 15.2 million pounds.

Between 1970 and 1985, the production of chewing tobacco increased 36 percent from 63.9 to 86.9 million pounds. This increase was due to the production of looseleaf tobacco, which increased 87.3 percent from 39.5 to 74.0 million pounds. The production of plug and twist tobacco declined during this period.

TRENDS IN SELF-REPORTED USE: SURVEY DATA

National Survey Data

National data from 1964 to 1985 are available from eight different national probability surveys and a national survey of college students. The majority of the data pertain to persons over the age of 17. The principal characteristics of these surveys are shown in table 2.

Office on Smoking and Health Surveys

Early data on the use of chewing tobacco and snuff are available from the 1964, 1966, 1970, and 1975 Adult Use of Tobacco Surveys that were

FIGURE 1.—Manufacturing Trends: Quantities of Smokeless Tobacco Manufactured in the United States From 1961 to 1985 Expressed in Million Pounds

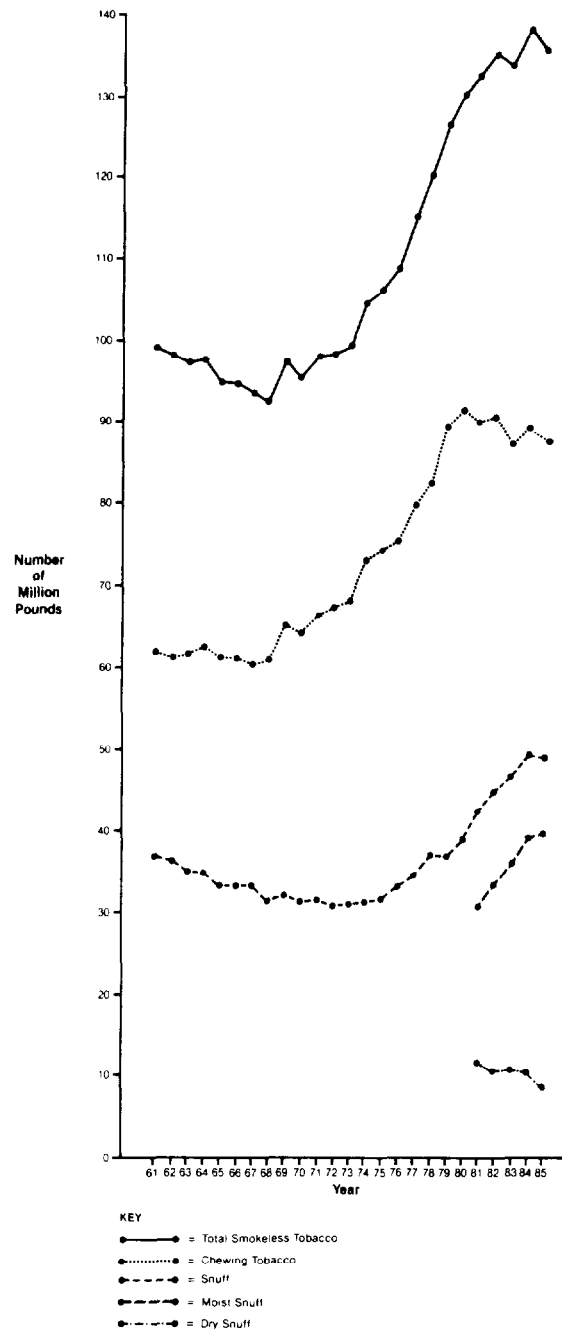


TABLE 2.—National Prevalence of Smokeless Tobacco Use: Data Sources

Survey	Type	Date	Respondents	Number of Respondents/ Households	Products	Questions
Office on Smoking and Health	Personal Interview	1964	Adults ≥ 21	5,794	Snuff and Chewing Tobacco Separately	"Have you ever used—at all regularly?" "Do you use—now?"
Office on Smoking and Health	Personal Interview	1966	Adults ≥ 21	5,770	Snuff and Chewing Tobacco Separately	"Have you ever used—at all regularly?" "Do you use—now?"
Office on Smoking and Health	Telephone	1970	Adults ≥ 21	5,200	Snuff and Chewing Tobacco Separately	"Have you ever used—at all regularly?" "Do you use—now?"
Office on Smoking and Health	Telephone	1975	Adults ≥ 21	12,000	Snuff and Chewing Tobacco Separately	"Have you ever used—at all regularly?" "Do you use—now?"
National Health Interview Survey Supplement (National Center for Health Statistics)	Personal Interview Including Proxy	1970	Persons ≥ 17	77,000/ 37,000	Snuff and Chewing Tobacco Separately	Does _____ presently use any other form of smokeless tobacco, such as snuff or chewing tobacco?
Simmons Study of Media Markets, Simmons Market Research Bureau, Inc.	Questionnaire	1980 1981 1982 1983 1984 1985	Adults ≥ 18	15,000- 19,000	Snuff Only	1980 to 1983 "Do you use it yourself—snuff (smokeless tobacco)?" 1984 to 1985 "Do you yourself use any of the following tobacco products?" Snuff (ST) listed as an option.
Simmons National College Study, Simmons Market Research Bureau, Inc.	Questionnaire	1983 1985	College Students ≥ 18	2,011- 2,373	Snuff Only	"Please mark which of the items listed below you yourself use." Snuff (smokeless tobacco) listed as an option.
Current Population Survey Supplement—Census Bureau for Office on Smoking and Health	Personal Interview Including Proxy	1985	Persons ≥ 16	120,000/ 58,000	Snuff and Chewing Tobacco Separately	Does _____ presently use any other form of tobacco, such as snuff or chewing tobacco? What other forms of tobacco does _____ presently use?
NIDA Household Survey	Personal Interview	1985	Persons ≥ 12	8,000	Snuff and Chewing Tobacco Combined	"On the average, in the past 12 months, how often have you used chewing tobacco or snuff or other smokeless tobacco?"

**TABLE 3.—Use of Smokeless Tobacco in the United States by
Individuals Over 21 Years of Age***

Use Category	Percentage of Users							
	Males				Females			
	1964	1966	1970	1975	1964	1966	1970	1975
Now Use Snuff	2.0	3.1	2.9	2.5	2.0	2.1	1.4	1.3
Used to Use Snuff	3.6	3.9	4.2	4.0	0.9	1.0	1.1	1.1
Have Ever Used Snuff †	5.7	7.2	7.1	6.4	2.9	3.1	2.6	2.4
Now Use Chewing Tobacco	5.1	7.1	5.6	4.9	0.5	0.4	0.6	0.6
Used to Use Chewing Tobacco	12.0	13.2	19.1	16.1	1.0	1.1	1.8	1.2
Have Ever Used Chewing Tobacco†	17.2	20.5	24.7	21.0	1.5	1.5	2.4	1.8

* "Use" not further defined with respect to frequency.

† Includes those who used to use, but did not state if they used it currently.

Source: National Clearinghouse on Smoking and Health.

conducted by the National Clearinghouse for Smoking and Health, currently the Office on Smoking and Health (OSH) (18-20). National probability samples of 5,700 to 12,000 individuals over the age of 21 from randomly selected households were interviewed by telephone regarding the use of tobacco products. Between 1964 and 1975, the prevalence of smokeless tobacco use remained fairly stable. Results are summarized in table 3. Three patterns in these data may be noted:

- Less than 5 percent of the population reported using smokeless tobacco.
- Nationally, use was higher among males than females.
- Among males, the prevalence of use of chewing tobacco was higher than that for snuff.

National Health Interview Survey

In 1970, the National Center for Health Statistics included a question on current use of snuff and chewing tobacco in its National Health Interview Survey (NHIS) (21). One respondent per household provided information on all household members age 17 and older. Data were collected on approximately 77,000 persons in 37,000 households. Estimates indicate that 1.4 percent of males used snuff and 3.8 percent used chewing tobacco (table 4).

Simmons Market Research Bureau, Inc.

National probability data that were collected annually from 1980 through 1985 for the Simmons Study of Media and Markets provide estimates of the prevalence of snuff use among adults who were 18 years of age or older. Sample size ranged from 15,000 to 19,000. Data are summarized in table 5 for the years 1980 to 1985. The prevalence

**TABLE 4.—Prevalence of the Use of Snuff and Chewing Tobacco
Among Males by Age, 1970 NHIS and 1985 CPS Surveys***

Product	1970 HIS		1985 CPS	
	Age	Percentage of Users	Age	Percentage of Users
Snuff	17-19	0.3	16-19	2.9
	20-29	0.6	20-29	2.7
	30-39	0.7	30-39	1.8
	40-49	1.2	40-49	1.5
	50+	2.7	50+	1.4
	Total	1.4	Total	1.9
Chewing Tobacco	17-19	1.2	16-19	3.0
	20-29	1.9	20-29	4.2
	30-39	2.8	30-39	3.7
	40-49	3.0	40-49	3.3
	50+	6.5	50+	4.2
	Total	3.8	Total	3.9

* "Use" not further defined with respect to frequency.

Sources: National Center for Health Statistics, National Health Interview Survey, 1970 (unpublished). Office on Smoking and Health, Current Population Survey, 1985 (unpublished).

**TABLE 5.—National Prevalence of Current Use of Snuff by
Gender, Age, and Race for 1980 Through 1985***

Sample	Percentage of Users					
	1980	1981	1982	1983	1984	1985
Total	1.6	2.2	2.6	2.3	1.9	1.9
Gender						
Males	2.4	3.7	4.2	3.8	3.0	3.2
Females	0.8	0.8	1.1	0.9	1.0	0.7
Age						
18-24	1.4	2.6	4.3	3.5	3.2	2.8
25-34	2.5	2.8	3.1	3.0	2.0	2.1
35-44	1.0†	1.3	1.6	1.8	1.5	1.0
45-54	1.3†	1.3	1.4†	1.0†	1.1†	1.5
55-64	1.2†	1.7	1.7	2.3	1.1†	1.3
≥ 65	1.6†	2.8	2.6	1.4	2.5	2.4
Race						
Black	2.3†	1.6†	3.0	2.9	2.9	2.4
White	1.5	2.2	2.6	2.3	1.9	1.9
Other	1.9†	1.4†	1.1†	NA	0.4†	1.2

* Adults defined as individuals over 18 years of age. Use not further defined with respect to frequency.

† Number of cases too small for reliable estimates.

Source: Simmons Market Research Bureau, Inc., Study of Media and Markets, 1980-1985.

**TABLE 6.—Prevalence of Snuff Use Among College Students
18 Years of Age or Older by Gender and Year***

Sample	Percentage of Users	
	1983	1985
Total	2.7	3.5
Gender		
Males	5.4	6.7
Females	0.1†	0.2†
Race		
Black	1.5†	1.4†
White	5.1	3.6
Other	4.9†	4.3†

* Current use; frequency of use not specified.

† Projection relatively unstable because of small sample.

Source: Simmons Market Research Bureau, Inc., Simmons National College Study, 1983 and 1985.

rate for "current use" of snuff was 2.4 percent for males in 1980 and 0.8 percent for females. Rates for males peaked at 4.2 percent in 1982 and were 3.2 percent in 1985. Since 1982, the highest rates of use have consistently been observed in the age group 18 to 24 years old. Comparatively higher rates of use were also observed in the age groups 25 to 34 years old and over age 65 (22).

The Simmons National College Study reports data from a probability sample of full-time students 18 years or older who were attending baccalaureate-granting colleges and universities in the coterminous United States. In 1983, 2,011 students were sampled, and 2,373 students were sampled in 1985. Five to 7 percent of males indicated use of snuff compared to 0.2 percent of females (table 6). The prevalence rate among male students exceeded that of the general adult male population (tables 5 and 6). In 1985, prevalence among college males was twice that of other adult males, while the rate for college women was less than one-third that among the general adult female population. The combined prevalence for male and female college students (3.5 percent) was very similar to that for 18- to 24-year-olds in the general population (2.8 percent) (tables 5 and 6) (23).

Current Population Survey

In the fall of 1985, the Census Bureau collected health information on approximately 120,000 persons in 58,000 households in its Current Population Survey (CPS) (24). OSH sponsored a supplement to this survey, which included a question on current use of snuff and chewing tobacco. One respondent per household provided information on all members age 16 and older. Provisional estimates of smokeless tobacco use indicate that 1.9 percent of males used snuff and 3.9 percent used chewing tobacco (table 4).

TABLE 7.—National Prevalence of Smokeless Tobacco Use by Adult Status and Sex, NIDA Sample, 1985*

Use Category	Percentage of Users			
	Males		Females	
	≤ 20 Years	≥ 21 Years	≤ 20 Years	≥ 21 Years
Used in Past Year	16	11	2	2
Used Formerly	4	7	2	2
Never Used	79	82	96	96

* Preliminary estimates not adjusted for oversampling of blacks and Hispanics.

Source: National Institute on Drug Abuse, 1985 National Household Survey on Drug Abuse. Preliminary results presented at the NIH Consensus Development Conference on the Health Implications of Smokeless Tobacco Use, January 1986.

TABLE 8.—Recency of Smokeless Tobacco Use by Sex and Age Group*

Use Category	Percentage of Users by Age Groups							
	12-17		18-25		26-39		40+	
	Males	Females	Males	Females	Males	Females	Males	Females
Used in Past Year	16	1	16	1	10	1	8	3
Used Formerly	4	2	7	1	5	1	8	2
Never Used	80	97	77	98	85	98	84	95

* Preliminary estimates not adjusted for oversampling of blacks and Hispanics.

Source: National Institute on Drug Abuse, 1985 National Household Survey on Drug Abuse. Preliminary results presented at the NIH Consensus Development Conference on the Health Implications of Smokeless Tobacco Use, January 1986.

National Institute on Drug Abuse Household Survey

The recently completed 1985 National Household Survey on Drug Use provides the national probability data on current use and correlates of use of smokeless tobacco by youth. It is the eighth in a series of national probability surveys conducted among household residents in the coterminous United States by the National Institute on Drug Abuse (NIDA). Data are collected on the use and adverse consequences that are associated with 11 drugs or drug classes. The 1985 survey oversampled for blacks and Hispanics and younger age groups. The total sample consists of approximately 8,000 face-to-face interviews. The data presented here are based on a preliminary analysis of 4,564 interviews. Provisional estimates are presented in tables 7 through 9.

Sixteen percent of males under the age of 21 reported using chewing tobacco or snuff within the last year, in contrast to 11 percent of older males (table 7). The decline in older age groups is seen more clearly when narrower age categories are used (table 8). An estimate of the prevalence of weekly use may be obtained by combining the use frequency

TABLE 9.—Frequency of Smokeless Tobacco Use in Past Year*

Past Year Use of Smokeless Tobacco	Percentage of Users				
	Age Groups for Males				Males and Females Age 12 and Above
	12-17	18-25	26-39	40+	
Most Days/Week	3	7	5	4	2
1 or 2 Days/Week	2	1	1	1	1
1 or More Days/Week	5	8	6	5	3
3-51 Days/Year	5	5	3	3	2
1-2 Days/Year	6	3	2	1	2
Not in Past Year	4	7	5	8	3
Have Tried	20	23	15	16	10
Never	80	77	85	84	90

* Preliminary estimates not adjusted for oversampling of blacks and Hispanics.

Source: National Institute on Drug Abuse, 1985 National Household Survey on Drug Abuse. Preliminary results presented at the NIH Consensus Development Conference on the Health Implications of Smokeless Tobacco Use, January 1986.

categories of "most days a week" and "1 or 2 days a week" (table 9). Use at least once a week peaks in the 18- to 25-year-old age groups at 8 percent. As in previous surveys, the use among females was consistently much lower than among males. Responses suggest slightly higher rates of use among women 40 years of age and older than among younger women (table 8) (25).

Discussion of National Survey Data

Despite varying methodologies among the national surveys (table 2), sufficient commonalities permit meaningful comparisons. The 1970 and 1975 OSH surveys and the 1980 to 1985 Simmons Study of Media and Markets indicate that the use of snuff by adult males remained constant within a range of 3 to 4 percent. Use by adult females also remained constant at about 1 percent. During this same 15-year period, the population over the age of 18 increased 32 percent from 133.5 million to 175.8 million (26). The production of all forms of smokeless tobacco increased 42 percent from 95.2 to 135.6 million pounds, and the production of fine-cut/moist snuff tripled. This may indicate the emergence of a new population of users.

The 1970 NHIS and the 1985 CPS both relied on the use of proxy respondents. Estimates of smokeless tobacco use are likely to be lower than the actual population prevalence because respondents may not always be aware of smokeless tobacco use by other members of the household. In fact, in 1970, the NHIS estimated that 1.4 percent of males used snuff and 3.8 percent used chewing tobacco. In the same year, the OSH Adult Survey, which did not use proxy respondents, provided corresponding estimates of 3 and 6 percent. Similarly, the CPS estimates that 1.9 percent of males used snuff in 1985, while the Simmons Study of Media and Markets estimates 3.2 percent.

However, comparisons between the 1970 NHIS and the 1985 CPS for the purpose of examining trends are appropriate. They suggest little change in the overall rate of adult male use of smokeless tobacco but indicate a marked change in the age distribution of users (table 4). In 1970, the use of smokeless tobacco was most common among older men; in 1985, the prevalence in the younger age groups had greatly increased.

Both the Simmons Study of Media and Markets and the NIDA survey show the highest rates of use among young adults ages 18 to 24. The Simmons National College Study indicates that male college students are as likely to use snuff as are other 18- to 24-year-olds. The Simmons data also show a slight elevation in prevalence among persons over the age of 65, which reflects the age distribution of traditional users of smokeless tobacco.

If the NIDA prevalence estimates are applied to current population figures (26), there are at present over 12 million persons in the United States ages 12 and older who have used some form of smokeless tobacco in the past year. Three million are under the age of 21, and 1.7 million of these are males 12 to 17 years old. An estimated 6 million persons use smokeless tobacco at least weekly. Of these, 0.5 million are males ages 12 to 17; 1.3 million are males ages 18 to 25; and approximately 780,000 are females.

The 1980 to 1985 Simmons Study of Media and Markets estimated that 2 to 4 million persons over the age of 18 were users of snuff. Of these, 0.6 to 1.2 million were between the ages of 18 and 24.

Table 10 summarizes data on the prevalence of smokeless tobacco use by region from three national surveys conducted in 1985. Among these adult samples, use was highest in the South and lowest in the Northeast, with the West and North Central/Midwest falling in between.

These surveys provide self-report data only; no direct validation attempts were made. Because no strong social sanctions regarding smokeless tobacco use exist for adults, systematic misrepresentation by them is unlikely. However, under the conditions of a personal interview, as used in the NIDA study, adolescents would be more likely to underreport than overreport their use of smokeless tobacco. In addition, the preliminary estimates from the NIDA survey have not been adjusted for oversampling of blacks and Hispanics. In this sample, blacks and Hispanics reported less smokeless tobacco use than whites, and their overrepresentation would result in underestimates of national prevalence.

State and Local Survey Data

State and local surveys provide much of the information after 1980 on the use of smokeless tobacco. Since most of these surveys were conducted in schools, often motivated by apparent increases in students'

**TABLE 10.—Prevalence of Smokeless Tobacco Use by
Census Region, 1985**

Prevalence Category	Percentage Reporting Use			
	Northeast	North Central	South	West
CPS				
Chewing Tobacco	1.6	3.7	7.0	3.9
Snuff	1.2	2.3	3.1	1.6
Simmons				
Snuff	1.5	1.3	2.9	1.3
NIDA*				
(Snuff and/or chewing tobacco)				
Weekly Use or				
More Often	1.0	2.0	5.0	4.0
Any Use in Past Year	4.0	6.0	8.0	9.0

* Preliminary estimates not adjusted for age and race.

Sources: Office on Smoking and Health, Current Population Survey, 1985 (unpublished). Simmons Market Research Bureau, Inc., Study of Media and Markets, 1980-1985. National Institute on Drug Abuse, 1985 Household Survey on Drug Abuse. Preliminary results presented at the NIH Consensus Development Conference on the Health Implications of Smokeless Tobacco Use, January 1986.

use of smokeless tobacco products, there may be a selection bias. However, the large and growing number of reports and the wide geographic coverage support the conclusion that smokeless tobacco use is not a localized phenomenon. Indeed, the consistency of such data suggests that smokeless tobacco has become a product that is used by large numbers of teenage and young adult males.

Adult Use

Several reports provide a tentative profile of local usage patterns of smokeless tobacco among adults. In 1979, tobacco use information was collected from 4,282 men between the ages of 21 and 84 in 10 geographic areas as part of the National Bladder Cancer Study, a population-based case control study (27). The overall prevalence for having "ever used snuff for 6 months or more" among the control subjects (randomly selected from the general population) was 5 percent; for chewing tobacco, the corresponding figure was 12 percent. A breakdown by age indicated much more use of smokeless products by older men than younger men (table 11).

Glover and his colleagues conducted a random sample telephone survey of 280 persons in Pitt County, North Carolina (28). A user was defined as a person who answered "yes" to the question, "Do you dip or chew tobacco?" Forty percent of males and 9 percent of females answered positively. High rates of use are probably not a new phenomenon since there is a tradition of smokeless tobacco use among both sexes in this area, and tobacco is a major agricultural product.

TABLE 11.—Prevalence of Snuff and Chewing Tobacco Use by Adult Males in 10 Geographic Areas

Sample	n	Percentage Reporting Ever Used	
		Snuff	Chewing Tobacco
All Men	4,282	5	12
Age			
21-44	240	0	2
45-64	1,653	3	6
65-84	2,389	7	16
Area of Residence			
Atlanta	186	8	23
Connecticut	654	4	12
Detroit	355	8	20
Iowa	552	12	14
New Jersey	1,288	2	10
New Mexico	129	7	20
New Orleans	115	1	6
San Francisco	542	2	8
Seattle	255	10	6
Utah	206	5	7
Race			
White	3,892	5	11
Nonwhite	390	5	18

Source: National Bladder Cancer Study. Hartge, P., Hoover, R., and Kantor, A. Bladder cancer risk and pipes, cigars, and smokeless tobacco. *Cancer*, 55: 901-906, 1985. Research supported by the National Cancer Institute, the Food and Drug Administration, and the Environmental Protection Agency.

Gritz, Ksir, and McCarthy surveyed a sample of 214 students at the University of Wyoming (29). In their sample, 27.1 percent of males and 4.1 percent of females reported "current use," with the criterion for "current use" unspecified. The vast majority of users (84 percent) used moist snuff.

Glover and his colleagues reported a survey of 5,894 students in physical education classes at 72 colleges and universities from 8 States (Oregon, Arizona, Colorado, Oklahoma, Minnesota, Ohio, South Carolina, and Connecticut) (30). Twenty-two percent of the males who were surveyed reported using smokeless tobacco compared to 2 percent of the females. Combined rates of use for both sexes ranged from 15 percent in Oklahoma to 8 percent in Connecticut. The majority of the users reported using less than one can or pouch per week.

Adolescent Use

Studies of school-age youth conducted since 1980 are summarized in table 12 (31-45). Five different criteria for classifying use have been selected for data display: daily use, weekly use, monthly use, current use (no frequency specified), and ever used.

Recent regional data on the use of smokeless tobacco have been collected by a number of National Cancer Institute grantees in the course

TABLE 12.—Prevalence of Use of Smokeless Tobacco Among Youth by Gender and Grade: Regional and State-Level Surveys Reported Since 1980*

Location (reference)	Grade(s)	Males	Females	Total	n
Daily Use					
Arkansas (31)	10-12	26.0	—	—	179
Arkansas (32)	10-12	—	—	15.0	901
Nebraska (33)	7-12	2.5	0.0	—	2,612
Ohio (34)	4-12	—	—	—	—
Chewing Tobacco		11.4	0.2	—	1,004
Snuff		19.7	0.4	—	1,004
Oregon (35)	7	8.8	0.7	—	443
	9	18.5	0.0	—	249
	10	23.1	2.4	—	130
Oregon (36)	7	4.6	—	—	710
	8	5.8	—	—	139
	9	9.7	—	—	432
	10	10.6	—	—	255
Wisconsin (37)	7	3.0	0.0	—	—
	8	6.0	0.0	—	—
	9	3.0	0.0	—	—
	10	8.0	0.0	—	—
	11	11.0	0.0	—	—
	12	15.0	0.0	—	—
	Total	—	—	—	—
Weekly Use (Or more often)					
Nebraska (33)	7-12	4.8	0.0	—	2,616
Wisconsin (37)	7	12.0	—	—	—
	8	18.0	—	—	—
	9	15.0	—	—	—
	10	24.0	—	—	—
	11	25.0	—	—	—
	12	37.0	—	—	—
	Total	—	1.0	—	25,000
Monthly Use (Or more often)					
Arizona (38)	8-12	18.4	—	—	1,080
Midwestern States (39)	10-12	33.0	0.0	—	323
Nebraska (33)	7-12	7.1	0.0	—	2,616
Current Use (Frequency not specified)					
Arkansas (31)	10-12	31.8	2.2	—	179
Arkansas (32)	10	—	—	13.8	326
	11	—	—	20.6	330
	12	—	—	23.7	245
	Total	36.7	2.2	—	901

TABLE 12.—Continued

Location (reference)	Grade(s)	Males	Females	Total	n
Current Use (Cont.)					
Colorado (40)	10-12	21.6	0.6	—	1,119
Colorado (41)	10-12	26.0	0.0	—	445
Louisiana (42)†					
1976-1977					
Chewing Tobacco	8-9	11.0	—	—	—
	10-11	17.0	—	—	—
	12-13	25.0	—	—	—
	14-15	24.0	—	—	—
	16-17	15.0	—	—	—
Snuff	8-9	4.0	—	—	—
	10-11	7.0	—	—	—
	12-13	5.0	—	—	—
	14-15	11.0	—	—	—
	16-17	5.0	—	—	—
	Total	—	—	—	2,880
1981-1982					
Chewing Tobacco	8-9	24.0	—	—	—
	10-11	32.0	—	—	—
	12-13	39.0	—	—	—
	14-15	43.0	—	—	—
	16-17	15.0	—	—	—
	Total	—	—	—	1,981
Snuff	8-9	21.0	—	—	—
	10-11	26.0	—	—	—
	12-13	32.0	—	—	—
	14-15	30.0	—	—	—
	16-17	14.0	—	—	—
	Total	—	—	—	1,981
Pennsylvania (43)	7-12	30.0	0.0	—	538
Texas (44)	7-12	19.0	0.0	—	5,392
Wyoming (29)	7-9	24.5	1.2	—	2,408
Ever Used					
Arkansas (45)	K	—	—	21.4	112
Ohio (34)					
Chewing Tobacco	4-12	58.0	12.0	—	—
	Total	—	—	—	1,007
Snuff	4-12	64.0	24.0	—	—
	Total	—	—	—	1,007
Oregon (35)	7	63.4	19.9	—	445
	9	72.7	16.4	—	249
	10	76.7	23.8	—	133
Wisconsin (37)	7	32.0	—	—	—
	8	45.0	—	—	—
	9	47.0	—	—	—
	10	50.0	—	—	—
	11	47.0	—	—	—
	12	48.0	—	—	—
	Total	—	—	11.0	25,000

* Unless otherwise indicated, figures represent the usage of chewing tobacco and/or snuff. Multiple entries have been made for studies that provide for more than one classification criterion.

† Age listed rather than grade.

of their ongoing research on tobacco use by youth (46). Through collaboration, these investigators have achieved more standardization in data collection than in previous studies, which makes comparisons among the different locales more meaningful. Although there were some differences in methodology, all of the studies addressed one or both of the following research questions:

1. What percentages of males and females have ever used smokeless tobacco?
2. What percentages of males and females have used smokeless tobacco in the last 7 days?

Adolescent males may be subject to pressures that simultaneously discourage and encourage smokeless tobacco use. Underreporting of use may result from the presence of teachers and the setting in which the survey is administered. Overreporting may result from peer pressure to be seen as a smokeless tobacco user. Accurate reporting may be facilitated by collecting breath or saliva samples when surveys are completed. Respondents who believe that their self-reports can be objectively verified via biochemical testing tend to provide more accurate responses (47-49). Biochemical validation was used in 14 of the 17 subsamples reported in table 13.

Most studies do not distinguish between snuff and chewing tobacco. In reports where the two have been separated, both substances were found to be in use (34,42,43).

Rates of smokeless tobacco use were consistently higher among males than females. This difference is especially marked when more precise classifications for regular use are employed. While substantial numbers of adolescent females report having tried smokeless tobacco at least once, very few use it on a regular basis (33-35,37,39,46).

The use of smokeless tobacco by youth was generally higher in rural than urban areas, in small communities, and in areas where there is a tradition of smokeless tobacco use (34,37,46). However, high rates of use have also been reported in large metropolitan areas as well (37,40,46).

Table 14 summarizes data on smokeless tobacco use by ethnic groups collected by investigators using standardized questions (46). To date, little information has been available on smokeless tobacco use by non-whites, and some early research suggested that minority youth were not taking up the practice (42). In these studies, however, Hispanic youth showed rates of smokeless tobacco use comparable to whites, and Native American rates were consistently higher. In most locales, use was less common among Asians and blacks. Nationally, black college students are less likely to use snuff than are white college students (table 6). Prevalence estimates for smokeless tobacco use by black adults, however, have equaled or exceeded those of whites (tables 5 and 11).

The likelihood of using smokeless tobacco appears to increase with age as well as over time (32-35,37,42,46). Only one study has collected

TABLE 13.—Prevalence of Use of Smokeless Tobacco Among Youth by Gender and Grade: Local Surveys Using Standardized Questions

Sample	Grade	Males		Females	
		Percentage	n	Percentage	n
Used in Last 7 Days					
California					
Suburban/Rural	6	4.7	(469)	0.7	(407)
	7	14.8	(574)	1.4	(557)
	8	9.2	(487)	1.6	(499)
Minnesota					
Suburban/Urban	9	18.1	(2,015)	2.4	(2,146)
Montana					
Urban	4	9.4	(477)	2.0	(403)
	5	11.9	(429)	1.5	(392)
	6	13.9	(446)	3.2	(402)
New York					
Urban	4	3.9	(306)	0.3	(298)
	5	2.9	(272)	0.4	(275)
	6	10.7	(252)	0.4	(243)
New York					
New York City	6	1.1	(1,488)	0.9	(1,494)
New York					
Suburban	7	3.0	(2,016)	0.0	(1,811)
Oregon					
Suburban/Rural	6	6.0	(602)	0.9	(542)
	7	9.1	(627)	0.8	(618)
	8	13.6	(663)	1.0	(608)
	9	17.3	(572)	0.5	(567)
	10	22.2	(514)	2.3	(471)
	11	22.7	(440)	0.5	(431)
Oregon					
Suburban/Urban	6	1.9	(571)	0.4	(525)
	7	4.6	(570)	1.4	(575)
	8	6.8	(514)	0.8	(533)
	9	14.8	(588)	1.2	(575)
Southeastern					
United States	6	9.8	(305)	1.3	(228)
10 SMSA's	7	12.1	(346)	0.6	(325)
	8	10.4	(279)	1.6	(313)
Vermont					
Rural	5	9.3	(288)	0.3	(317)
	6	14.9	(328)	1.0	(289)
Vermont					
Urban	4	2.8	(216)	0.0	(199)
	5	4.8	(207)	1.0	(201)
	6	5.4	(204)	0.0	(193)
Washington					
Rural	4	4.4	(45)	0.0	(47)
	5	6.4	(141)	1.3	(156)
	6	8.8	(968)	2.1	(964)
	7	13.1	(521)	4.1	(514)
	8	14.8	(316)	5.2	(325)
Washington					
Rural	10	23.7	(215)	0.4	(233)

TABLE 13.—Continued

Sample	Grade	Males		Females	
		Percentage	n	Percentage	n
Ever Used					
California					
Suburban/Rural	6	32.6	(473)	7.8	(411)
	7	56.2	(578)	19.6	(567)
	8	56.7	(492)	20.0	(504)
California					
Los Angeles	7	24.9	(273)	6.7	(310)
SHARP					
California					
Los Angeles	7	25.3	(479)	7.7	(480)
SMART	8	31.9	(429)	8.1	(418)
California					
Los Angeles	8	32.0	(1,240)	6.9	(1,474)
TVSP					
Minnesota					
Suburban/Urban	9	62.1	(2,001)	22.9	(2,133)
Montana					
Urban	4	41.0	(480)	17.5	(401)
	5	56.9	(431)	19.3	(394)
	6	68.2	(443)	24.6	(402)
New York					
Urban	4	23.1	(307)	3.4	(298)
	5	33.5	(272)	5.1	(275)
	6	47.8	(255)	7.0	(243)
New York					
New York City	6	6.7	(1,488)	3.0	(1,494)
New York					
Suburban	7	25.3	(2,016)	4.1	(1,811)
Oregon					
Suburban/Rural	6	48.3	(607)	16.2	(551)
	7	57.9	(639)	19.8	(630)
	8	64.5	(677)	23.8	(617)
	9	70.4	(577)	26.7	(576)
	10	74.7	(522)	31.1	(485)
	11	77.5	(445)	34.2	(436)
Oregon					
Suburban/Urban	6	32.4	(568)	8.7	(528)
	7	44.9	(568)	16.8	(572)
	8	54.1	(512)	17.2	(535)
	9	61.3	(589)	24.7	(575)
Southeastern					
United States	6	47.6	(309)	11.4	(229)
10 SMSA's	7	49.0	(353)	13.5	(325)
	8	51.4	(280)	15.6	(314)
Vermont					
Rural	5	38.8	(289)	8.2	(317)
	6	54.8	(332)	7.2	(290)
Vermont					
Urban	4	17.4	(213)	3.0	(200)
	5	26.2	(207)	5.5	(201)
	6	39.8	(206)	3.1	(193)
Washington					
Rural	4	15.6	(45)	0.0	(47)
	5	27.0	(141)	7.7	(156)
	6	49.0	(968)	13.0	(964)
	7	52.0	(521)	16.0	(514)
	8	58.9	(316)	20.1	(325)
Washington					
Rural	10	73.5	(215)	30.9	(233)
Waterloo, Canada					
Suburban/Rural	11	26.0	(281)	5.5	(444)

**TABLE 14.—Mean Frequency of Smokeless Tobacco Use
During Last 7 Days by Ethnicity of Male Respondents**

Sample	Ethnicity	Prevalence	
		n	%
California Suburban/Rural Grades 6-8	Asian	192	3.7
	Black	118	6.1
	Hispanic	188	11.2
	White	1,046	11.4
Minnesota Suburban/Urban Murray	Asian	36	13.9
	Black	201	4.0
	Hispanic	24	45.8
	Native American	38	18.4
	White	1,602	19.6
New York New York City Grade 6	Asian	119	2.5
	Black	205	0.5
	Hispanic	510	1.0
	White	501	1.2
New York Suburban Grade 7	Asian	23	4.3
	Black	47	2.1
	Hispanic	39	2.6
	Native American	26	3.8
	White	1,796	3.3
Oregon Suburban/Rural Grades 6-11	Asian	38	5.3
	Black	33	15.2
	Hispanic	61	16.4
	Native American	120	23.3
	White	3,162	14.2
Oregon Suburban Grades 6-9	Asian	71	2.8
	Black	231	3.9
	Hispanic	26	0.0
	Native American	48	12.5
	White	1,847	7.6
Southeastern United States 10 SMSA's	Black	258	3.9
	White	652	14.0
Washington Rural Grades 4-8	Asian	148	6.1
	Black	119	1.7
	Hispanic	111	9.0
	Native American	179	30.7
	White	1,434	9.4

both cross-sectional and longitudinal data. Hunter and her colleagues assessed tobacco use by children in Bogalusa, Louisiana, in 1976-77 and again in 1981-82 (42). The use of both snuff and chewing tobacco increased over time within age categories, within age cohorts, and across age categories (table 12). A decrease in use was observed in the oldest age category, 16-17 years old, but has not been seen in other locales (tables 12 and 13). The decrease may reflect age-related changes in normative behavior particular to that area or a cohort effect.

Peer and family members are found consistently to be important influences on smokeless tobacco use by children and adolescents. Young users of smokeless tobacco have more friends who also use smokeless tobacco (34,36,39,45) and may themselves identify friends' encouragement as a reason for use (35,44). Users of smokeless tobacco are also more likely to have family members who themselves use smokeless tobacco (34,36,45) and encounter less parental disapproval of the practice (31,34).

In a special National Program Inspection study prepared by the Office of the Inspector General of the Department of Health and Human Services, young current and former users of smokeless tobacco were interviewed in depth (50). Two hundred and ninety students in junior and senior high schools from 16 States volunteered to participate. All had used smokeless tobacco on a weekly or daily basis. While this study was not designed to provide prevalence estimates, it provides useful information about the attitudes and practices of some adolescent smokeless tobacco users.

Over 90 percent of these respondents used snuff exclusively, and over 55 percent indicated that they would have strong cravings if they tried to quit. On the average, this group reported first trying snuff at age 10 and beginning regular use by age 12. Fifty percent cited pressure from friends as their primary reason for initiating use, but continued use was most often attributed to enjoyment of taste (64 percent) and habit strength ("being hooked," 37 percent). Over 85 percent thought that dipping and chewing can be harmful to health, but less than 55 percent considered regular use to present a moderate or severe risk.

CONCLUSIONS

1. Recent national data indicate that over 12 million persons used some form of smokeless tobacco (chewing tobacco and snuff) in 1985 and that approximately 6 million used smokeless tobacco weekly or more often. Use is increasing, particularly among young males.
2. The highest rates of use are seen among teenage and young adult males. A recent national survey indicates that 16 percent of males between 12 and 25 years of age have used some form of

smokeless tobacco within the past year and that from one-third to one-half of these used smokeless tobacco at least once a week. Use by females of all ages is consistently less than that of males; about 2 percent have used smokeless tobacco in the last year.

3. State and local studies corroborate the national survey findings. The prevalence of smokeless tobacco use by youth and young adults varies widely by region, but use is not limited to a single region. In several parts of the country, as many as 25 to 35 percent of adolescent males have indicated current use of smokeless tobacco.

RESEARCH NEEDS

More systematic and detailed national and local surveys on smokeless tobacco should be conducted.* National probability sample surveys need to be supplemented with surveys of suspected "hot spots" to detect the extent of high-risk areas in the country and the prevalence of use in these areas.

Standardized methods are essential to facilitate appropriate comparisons among data. The current state of assessment is similar to the early days of research on cigarette smoking before standardized formats for assessment of prevalence and quantification of dosage became available. Accurate and reproducible dosage measurement for smokeless tobacco products is needed. Standardization may prove more difficult than for cigarette smoking because of the multiplicity of product forms.

Specific items that require standardization include the following:

- Collection of data separately for snuff and chewing tobacco.
- Definition of user classified according to the frequency of use. To date, little attention has been given to finer distinctions of use, including quantity used, the appropriate unit of measurement, and time that the product is allowed to remain in the mouth.
- Description of use. Data need to be gathered on patterns of use as well as the relationship of use to cigarette smoking.
- Reporting of age of initiation and duration of use.
- Definition of quit attempts and a quitter.
- Natural history of smokeless tobacco use and its relationship to other substance use, including other forms of tobacco, particularly cigarettes.
- Surveys of adequate sizes to permit stratification of the samples by relevant variables such as gender, age, ethnicity, socioeconomic status, cigarette smoking status, and various behavioral factors such as attitudes and knowledge, peer pressure, and academic status.

* The 1986 OSH Adult Use of Tobacco Survey will address many of the items listed below.